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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,945	12/07/2000	John C. Waldrop III	99-113A	9765

7590 02/26/2003

JOHN HAMMAR
The Boeing Company
MC 13-08
P.O.Box 3707
Seattle, WA 98124

EXAMINER
STAICOVICI, STEFAN

ART UNIT	PAPER NUMBER
1732	13

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

HS-13

Office Action Summary	Application N .	Applicant(s)	
	09/731,945	WALDROP ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

4)☒ Claim(s) *1,2,4-8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) *2* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-8, 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *11* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicants' amendment filed December 4, 2002 (Paper No. 12) has been entered. Claims 1, 10 and 12 have been amended. No new claims have been added. Claims 3 and 9 have been canceled. Claims 1-2, 4-8 and 10-12 are pending in the instant application.

Election/Restrictions

2. Applicant's election with traverse of Group I in Paper No. 12 is acknowledged. The traversal is on the ground(s) that because the "articles of claim 2 are...made by the [claimed] process so the process cannot be used to make other products and only those products so made are included in the scope of the claimed articles." (see page 2 of the amendment filed December 4, 2002). This is not found persuasive because under MPEP § 2113, although "product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself." Further, MPEP § 2113 states that,

> The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) (Claim was directed to a novolac color developer. The process of making the developer was allowed. The difference between the inventive process and the prior art was the addition of metal oxide and carboxylic acid as separate ingredients instead of adding the more expensive pre-reacted metal carboxylate. The product-by-process claim was rejected because the end product, in both the prior art and the allowed process, ends up containing metal carboxylate. The fact that the metal carboxylate is not directly added, but is instead produced in-situ does not change the end product.).

Further, in view of MPEP § 803, a proper requirement for restriction between patentably distinct invention includes:

(1) A showing that the inventions as claimed are independent or distinct. As shown in the Office Action mailed June 25, 2002 (Paper No. 10), in the instant application the product as claimed can be made by another and materially different process such as molding a resin pre-impregnated reinforcement under heat and pressure *without the use of vacuum assisted resin flow* (emphasis added); and

(2) A showing of a serious burden on the examiner. As shown in the Office Action mailed June 25, 2002 (Paper No. 10), the inventions in the instant application are classified in class 264, subclass 510 and respectively class 428, subclass 297.4, hence the instant claimed inventions requiring a search in different classes.

Applicants' remarks that the "restriction rules unfairly discriminate against U.S. applicants insofar as an article and its method of manufacture are subject to restriction if filed by U.S. citizens but are a single invention if filed by a foreign national" because such "a rule is arbitrary and capricious, unfair, and an abuse of discretion" have been taken into consideration, but are beyond the discretion of the Examiner.

It is submitted that the criteria of MPEP § 803 has been met and as such the requirement is still deemed proper and is therefore made FINAL.

Specification

3. The abstract of the disclosure is objected to because the Abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art. A patent abstract is a concise statement of the technical disclosure

of the patent and should include that which is new in the art to which the invention pertains. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 4-8 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "*low* modulus" and "*high* elongation" in claims 1 and 10 are relative terms which render the claims indefinite. The terms "*low* modulus" and "*high* elongation" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The term "modest" in claims 1 and 10 is a relative term which renders the claim indefinite. The term "modest" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The term "stiff but pliable" in claims 1 and 10 is a relative term which renders the claim indefinite. The term "stiff but pliable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 1 recites the limitation "the infusing resin" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Claims 4-8 are rejected as dependent claims.

Claim 4 is dependent upon itself. It should be noted that for the purpose of examination it has been assumed that claim 4 depends from claim 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of White *et al.* (US Patent No. 5,427,725) and in further view of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813) and McClure *et al.* (US Patent No. 6,090,335).

Lang *et al.* ('659) teach the basic claimed process of molding a reinforcement including, providing a mold (183), positioning a reinforcement preform (193) onto said mold (assembling a perform from suitable reinforcement in a mold), double bagging said reinforcement preform with an inner bag (185) and an outer bag (189), vacuum debulking said assembled preform and infusing resin into said debulked reinforcement perform using a vacuum-assisted resin transfer molding process (see col. 3, lines 7-23 and Figure 8). Further, Lang *et al.* ('659) teach a pressure differential between the inner bag (185) and the outer bag (189) that initially forms temporary

resin flow channels which are and then collapsed against the top surface of said reinforcement perform (193). Hence, it is submitted that bag relaxation is controlled by the pressure differential between the inner bag (185) and the outer bag (189).

Regarding claim 1, Lang *et al.* ('659) do not teach tackifying the fiber reinforcement. White *et al.* (725) teach molding a fiber composite including, a first step of partially curing a tackified fiber reinforced composite and a second step of molding said tackified composite by impregnating said fiber reinforced matt with a resin and co-curing the tackifier and the resin to form the composite (see Abstract). It would have been obvious for one of ordinary skill in the art to have tackified the fiber reinforced preform as taught by White *et al.* ('725) in the process of Lang *et al.* ('659) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

Further regarding claim 1, Lang *et al.* ('659) in view of White *et al.* ('725) do not teach a tackifier containing toughening agents for improved damage tolerances. EP 0 816 438 A2 teaches a fiber reinforced prepreg with superior tack containing particulate elastomers (toughening agent) that improve damage tolerances (see Abstract and col. 2, lines 44-58). Therefore, it would have been obvious for one of ordinary skill in the art to have provided toughening agents as taught by EP 0 816 438 A2 to the tackifier in the process of Lang *et al.* ('659) in view of White *et al.* ('725) because, EP 0 816 438 A2 specifically teaches that such toughening agents provide for improved damage tolerances, hence improving product quality and also because both all references teach similar materials and end-products.

Further regarding claim 1, although Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 teach a vacuum bag, Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 do not specifically teach a low modulus, high elongation nylon vacuum bag. Shepherd ('813) teach a low modulus, high elongation nylon vacuum bag (see col. 4, lines 60-65 and Table 1). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a low modulus, high elongation nylon vacuum bag as taught by Shepherd ('813) in the process of although Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 because, Shepherd ('813) specifically teach that such a bag allows for an improved molding process and as such an improved product.

Further regarding claim 1, Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 and Shepherd ('813) do not teach a resin flow distribution medium. McClure *et al.* ('335) teach a vacuum resin infusion process including, providing a resin flow control medium that forms a screen of open space that tends to wick the resin (fill fibers that act as weirs to the infusing resin) (see col. 1, lines 50-55). Further, McClure *et al.* ('335) teach removing said resin flow control medium prior to full curing, hence it is submitted that it is stiff, but pliable and chemically inert. Therefore, it would have been obvious for one of ordinary skill in the art to have provided a resin flow control medium as taught by McClure *et al.* ('335) in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2 and Shepherd ('813) because, McClure *et al.* ('335) specifically teach that a resin flow control medium creates a uniform and homogeneous resin flow, hence improving product quality. It is submitted that because the resin flow is uniform and homogeneous that markoff on the side of the vacuum bag in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and

in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) is eliminated. Further, it should be noted that the exposure temperature of the resin flow control medium is dependent on the type of resin being infused. It is submitted that the resin flow control medium in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) can withstand a temperature of up to about 600 °F because the resin used requires such curing temperatures.

In regard to claim 6, White *et al.* (725) teach a two-step molding process. Specifically, White *et al.* (725) teach that in the first step, the fiber reinforced matt is tackified at an elevated temperature of about 40 to 100 degrees C. In the second step, the heated tackified fiber reinforced matt is impregnated with resin in a mold to form a composite. Therefore, it would have been obvious for one of ordinary skill in the art to have first heated the fiber reinforced matt as taught by White *et al.* ('725) and then impregnated the heated tackified fiber reinforced matt under vacuum in the process of Lang *et al.* ('659) in view of EP 0 816 438 A2 and in further view of Shepherd ('813) and McClure *et al.* ('335) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity.

Specifically regarding claim 7, White *et al.* (725) teach a first step of partially curing a tackified fiber reinforced composite at a temperature of about 40 to 100 degrees C. In the second step, the heated tackified fiber reinforced matt is impregnated with resin in a mold to form a composite. Further, Lang *et al.* ('659) teach vacuum debulking a preform and infusing resin into said debulked reinforcement perform using a vacuum-assisted resin transfer molding process

(see col. 3, lines 7-23 and Figure 8). Therefore, it would have been obvious for one of ordinary skill in the art to have first heated the fiber reinforced matt as taught by White *et al.* ('725) and then debulked and impregnated the heated tackified fiber reinforced matt under vacuum in the process of Lang *et al.* ('659) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity and also because Lang *et al.* ('659) specifically teach that vacuum debulking reduces porosity, hence improving product quality.

Regarding claim 8, Lang *et al.* ('659) teach carbon fiber and epoxy resin (see col. 2, lines 54 and 68). White *et al.* (725) teach an epoxy resin tackifier (col. 4, lines 55-56). It would have been obvious for one of ordinary skill in the art to have tackified the fiber reinforced preform as taught by White *et al.* ('725) in the process of Lang *et al.* ('659) in view of EP 0 816 438 A2 and in further view of Shepherd ('813) and McClure *et al.* ('335) because, White *et al.* ('725) specifically teach that tackifying provides for net-shape molding of composites by allowing stacking of individual layers in a single operation, which in turn reduces production time, hence increasing productivity and also because, White *et al.* ('725) teach an epoxy tackifier used in conjunction with an epoxy molding resin (see col. 5, lines 55-60).

8. Claims 4-5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of White *et al.* (US Patent No. 5,427,725) and in further view of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813), McClure *et al.* (US Patent No. 6,090,335) and Imanara *et al.* (US Patent No. 5,364,584).

Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) teach the basic claimed process as described above.

Regarding claims 4-5, Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) do not teach an infusion direction that is tilted at an angle from the horizontal. Imanara *et al.* ('584) teach a molding process of a fiber reinforced matt including tilting the mold at an angle (see Figure 1). It would have been obvious for one of ordinary skill in the art to have tilted that mold assembly as taught by Imanara *et al.* ('584) in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

Further in regard to claim 5, and regarding claim 10, Imanara *et al.* ('584) teach that injection of resin occurs at a lower portion such that resin flows upwardly, hence against gravitation. Therefore, it would have been obvious for one of ordinary skill in the art to have injected resin at a lower portion of a mold such that resin flows against gravitation as taught by Imanara *et al.* ('584) in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Imanara *et al.* ('584) specifically teach that tilting and injecting resin against gravitation reduces the amount of voids in the final molded article, hence improving resin impregnation and product quality (see col. 4, lines 55-65).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of White *et al.* (US Patent No. 5,427,725) and in further view

of EP 0 816 438 A2, Shepherd (US Patent No. 5,129,813), McClure *et al.* (US Patent No. 6,090,335) and Stoeberl (US Patent No. 4,120,632).

Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) teach the basic claimed process as described above.

Regarding claim 11, Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) do not teach throttling the vacuum lines. Stoeberl ('132) teaches a vacuum molding process in which a resin is infused into a preform position in a mold cavity (see Figures 3c and 2b). Further, Stoeberl ('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). Therefore, it would have been obvious for one of ordinary skill in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Lang *et al.* ('659) in view of White *et al.* ('725) and in further view of EP 0 816 438 A2, Shepherd ('813) and McClure *et al.* ('335) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lang *et al.* (US Patent No. 6,406,659 B1) in view of Stoeberl (US Patent No. 4,120,632).

Lang *et al.* ('659) teach the basic claimed process of molding a reinforcement including, providing a mold (183), positioning a reinforcement preform (193) onto said mold (assembling a perform from suitable reinforcement in a mold), double bagging said reinforcement preform with an inner bag (185) and an outer bag (189), vacuum debulking said assembled preform and infusing resin into said debulked reinforcement perform using a vacuum-assisted resin transfer

molding process (see col. 3, lines 7-23 and Figure 8). Further, Lang *et al.* ('659) teach a pressure differential between the inner bag (185) and the outer bag (189) that initially forms temporary resin flow channels which are and then collapsed against the top surface of said reinforcement perform (193). Hence, it is submitted that bag relaxation is controlled by the pressure differential between the inner bag (185) and the outer bag (189).

Regarding claim 12, Lang *et al.* ('659) do not teach throttling the vacuum lines. Stoeberl ('132) teaches a vacuum molding process in which a resin is infused into a preform position in a mold cavity (see Figures 3c and 2b). Further, Stoeberl ('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). Therefore, it would have been obvious for one of ordinary skill in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Lang *et al.* ('659) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

Response to Arguments

11. Applicants' remarks filed December 4, 2002 (Paper No. 12) have been considered.

Applicants' arguments are drawn to the newly claimed limitations (see page 4 of the amendment filed December 4, 2002). In response, the newly argued claim limitations have been rejected in this Office Action as set forth above.

Applicants argue that the prior art does not teach or suggest throttling the vacuum lines (see page 4 of the amendment filed December 4, 2002). However, as shown above, Stoeberl

('132) teaches the idea of throttling vacuum line (13) in order to provide uniform distribution of resin (9) throughout the fiber reinforcement (1) (see col. 4, lines 35-50). Therefore, it would have been obvious for one of ordinary skill in the art to have throttled vacuum lines as taught by Stoeberl ('132) in the process of Lang *et al.* ('659) because, Stoeberl ('132) specifically teaches that throttling of a vacuum line provides uniform resin distribution throughout the fiber reinforcement and reduces porosity by allowing air to escape, hence improving product quality.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM and alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard D. Crispino, can be reached at (703) 308-3853. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Stefan Staicovici, PhD

Stefan Staicovici

2/23/03

Primary Examiner

AU 1732

February 23, 2003